Dam, Diversion (number)

Definition

A structure built to divert part or all the water from a waterway or stream into a different watercourse, an irrigation canal or ditch, or a water-spreading system.

Scope

This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. It does not apply to diversions (362), floodwater diversions (400), floodwater retarding dams (402), or grade stabilization structures (410).

Purpose

(1) To divert part or all the water from a waterway in such a manner that it can be controlled and used beneficially, or (2) to divert periodic damaging flows from one watercourse to another watercourse having characteristics that reduce the damage potential of the flows.

Conditions where practice applies

Where a diversion dam is needed as an integral part of an irrigation system or a water-spreading system designed to facilitate the conservative use of soil and water resources.

Where it is desirable to divert water from an unstable watercourse to a stable watercourse.

Where the water supply available is adequate for the purpose for which it is to be diverted.

Where the impact of a proposed dam on water quality, fish and wildlife habitat, forest, and visual resources are evaluated and the techniques and measures necessary to overcome the undesirable effects are made part of the work.

Planning considerations

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge. Compare the original water course with the diverted water course.

2. Effects of the use of diverted waters for irrigation.

Water Quality

1. Effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances carried by runoff.

2. Potential temperature changes in downstream waters resulting from differences in bank shading in different water courses.

3. Potential changes in the amount of soluble substances infiltrating and available for ground water recharge, as well as the potential for salt pick-up.

Design Criteria

Materials. All materials to be used in constructing the diversion dam and appurtenances shall have the strength, durability, and workability required to meet the installation and service conditions of the site.

Outlet works. If part of the flow is to be diverted, the outlet works must provide for positive control of both maximum and minimum diversions consistent with the purpose for which the diversion is made. If all the flow is to be diverted, the outlet works must provide for safe diversion of all expected flows, depending on site conditions.

Bypass works. The bypass works must be capable of passing all flows needed to satisfy downstream priorities and all flows in excess of diversion requirements, including expected flood flows. This may require a combination of orifices, weirs, and gates designed to meet the requirements of the site.

Special-purpose works. If debris, bedload materials, or sediments are present under flow conditions subject to diversion, provisions shall be made to bypass or remove materials that may be detrimental to the functioning of the outlet works, to other parts of the works, or to areas to which diversion is made. This may require the use of settling basins, debris traps, trash guards, or sluiceways, depending on site conditions.

Vegetation. Disturbed areas not otherwise covered or protected shall be established to grass as soon as practicable after construction. If soil or climatic conditions preclude the use of vegetation and protection is needed, nonvegetative materials, such as mulches or gravel, may be used. Seedbed preparation, seeding, fertilizing, and mulching shall comply with instructions in local technical guides. The vegetation shall be maintained and undesired species controlled by chemical or mechanical means.

Operation and maintenance. Provisions shall be made as necessary for operation and maintenance requirements and may include a formal plan for larger, more complex dams.

Plans and specifications

Plans and specifications for installing diversion dams shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

Dam, Diversion, Specifications

Specified materials shall be of adequate quality to provide the stability and durability required to achieve the planned objective. Consideration shall be given to appropriate factors of safety.

Measures and construction methods that enhance fish and wildlife values shall be incorporated as needed and as practical.

Construction operations shall be carried out in such a manner that erosion and air and water pollution are minimized and held within legal limits.

The completed job shall present a workmanlike finish.